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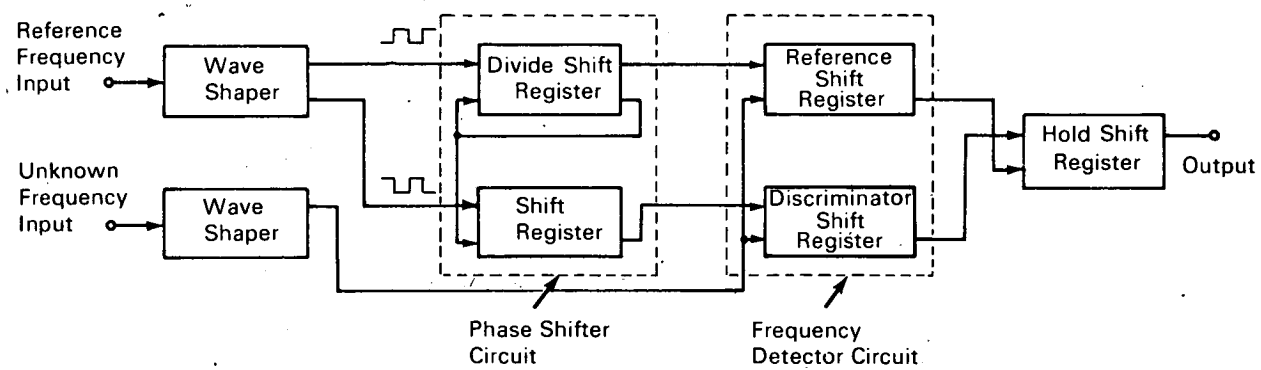
Digital Frequency Discriminator



A frequency discriminator has been designed to use digital logical circuitry and supply a single binary output signal. Five integrated circuit chips, each consisting of a shift register stage, are interconnected to provide a divide function, exclusive OR function, phase shifting and holding so that a single binary output signal results. When the binary signal is in a first state, it indicates that a specific one of the two input signals has a lower frequency than the other. In the second binary state, the opposite condition is indicated.

To date, most frequency discriminators have been analog in character with the phases of the various input signals compared in strictly analog fashion and the discriminator output indicating the frequency difference. Some digital circuits have been constructed for comparing frequencies of two input signals with the output as a set of signals that varies according to the difference between frequencies. These devices are called differential rate circuits and do not, at any given instant, indicate whether one input frequency, and which, is greater than the other but only indicate the frequency difference by the average of the output signals. In such circuits, the output signal frequency varies as the phases of the input signals precess with respect to each other. In certain applications it is desired that the frequency difference be continuously indicated in a binary sense to indicate whether one frequency, and which, is greater or less than the other. In such situations, the connection factor is the constant.

A reference frequency and a signal of unknown frequency are fed to the discriminator circuitry after first being formed into pulses or square waves by wave shapers between these sources and the discriminator. Two of the integrated circuit chips are interconnected to form a phase shifter circuit that shifts the relative phases of two received input signals, each with respect to the other. A second pair of integrated circuit chips provides phase detection plus a gating circuit that receives phase-shifted signals from the phase shifter and compares them. Output signals

(continued overleaf)

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are supplied to a fifth integrated circuit chip that receives and holds the binary information indicative of which input signal frequency is the greater.

Note:

Requests for further information may be directed to:

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Reference: TSP70-10010

Patent status:

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